

REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 1 and 4-11 are presented for consideration. Claim 1 is the sole independent claim. Claim 1 has been amended to clarify features of the subject invention. Support for these changes can be found in the original application, as filed. Therefore, no new matter has been added.

Applicant requests reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 1, 2, 4, 5 and 11 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 4,952,945 to Hikama in view of U.S. Patent No. 4,736,381 to Eden. Claims 6-10 were rejected under 35 U.S.C. § 103 as being unpatentable over that art combination above as applied to claim 1, and further in view of U.S. Patent No. 5,170,207 to Tezuka et al. Applicant submits that the cited art, whether taken individually or in combination, does not teach many features of the present invention, as previously recited in claims 1, 2 and 4-11. Therefore, these rejections are respectfully traversed. Nevertheless, Applicant submits that independent claim 1, as presented, amplifies the distinctions between the present invention and the cited art.

Independent claim 1 recites a projection exposure apparatus that includes a continuous emission excimer laser for providing laser light having a predetermined wavelength, an illumination optical system for illuminating a pattern of a reticle with the laser light from the continuous emission excimer laser, and a projection optical system for projecting the illuminated pattern of the reticle onto a substrate. The projection optical system is provided by a lens system

made of a substantially single glass material. The apparatus also includes a laser for injecting light having the predetermined wavelength into a resonator of the continuous emission excimer laser, a wavemeter for measuring the wavelength of the laser light from the continuous emission excimer laser, and changing means for changing a resonator length of the continuous emission excimer laser on the basis of a signal from the wavemeter so that the wavelength of the laser light from the continuous emission excimer laser becomes equal to the predetermined wavelength.

In the present invention, therefore, the laser injects the light having the predetermined wavelength into a resonator of the continuous emission excimer laser. In this manner, the central wavelength of the laser light outputted from a continuous emission excimer laser can be registered with the design wavelength of that continuous emission excimer laser from the very moment of the start of the emission. This is discussed in more detail in the subject specification from page 7, line 11, to page 9, line 26.

Applicant submits that the cited art does not teach or suggest such features of the present invention as recited in independent claim 1.

The Examiner relies on the Hikama patent for disclosing a projection exposure apparatus with a continuous emission excimer laser, an illumination optical system and a projection optical system made of a single glass material. The Examiner notes, however, that the Hikama patent does not teach or suggest a laser for injecting light having a predetermined wavelength into a resonator of an excimer laser. Rather, the Examiner relies on the Eden et al. patent for teaching a laser for injecting light having a predetermined wavelength into a resonator of a continuous emission excimer laser.

Applicant notes that the Eden et al. patent refers to the laser source 4 as being provided for injecting a beam into the laser source 1. This is discussed in the Eden et al. patent at column 4, lines 44-54, with respect to the discussion of Figure 2. Applicant submits, however, that the laser source 4 in the Eden et al. patent is merely a pumping laser for the laser source 1, which is arranged to apply, to the laser source 1, light having a wavelength shorter than the output light of the laser source. This is seen from Figure 2 of the Eden et al. patent, which shows the wavelength of the output light of the laser source 1 as being 502 nm, whereas the wavelength of the output light of the laser source 4 is 351 nm.

Applicant submits, therefore, that in the Eden et al. patent, the laser source 4 is a pumping laser, in which the wavelength of the output light thereof must always be shorter than the wavelength of the output light of the laser source 1. Applicant submits that the arrangement in the Eden et al. patent is in direct contrast to the present invention, in which the injecting laser injects light having the same wavelength as that of the output light of the continuous emission excimer laser. Thus, the laser source 4 in the Eden et al. patent is completely different from the injecting laser of the present invention.

For the reasons noted above, Applicant submits that the Eden et al. patent adds nothing to the teachings of the Hikama patent that would render obvious Applicant's present invention as recited in independent claim 1.

Turning to the remaining art cited, the Examiner relies on the Tezuka et al. patent for teaching that particular lasers are well known, with ArF lasers inherently including lasers wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than 0.1 pm,

which allows an image having a linewidth of 0.13 μm . The Examiner also relies on the Tezuka et al. patent for teaching the use of other types of lasers having other types of bandwidths, which provide other linewidths. Applicant submits, however, that the Tezuka et al. patent, as with the Eden et al. patent, does not teach or suggest the salient features of the present invention recited in independent claim 1 of a laser for injecting light having a predetermined wavelength into a resonator of a continuous emission excimer laser. Therefore, the Tezuka et al. patent also does not add anything to the teachings of the remaining art cited that would render obvious Applicant's present invention as recited in independent claim 1.

For the foregoing reasons, Applicant submits that the present invention, as recited in independent claim 1, is patentably defined over the cited art.


Dependent claims 2 and 4-11 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in independent claim 1. Further individual consideration of these dependent claims is requested.

Applicant further submits that this Amendment After Final Rejection clearly places this application in condition for allowance. This Amendment was not earlier presented because Applicant believed that the prior Amendment placed the application in condition for allowance. Accordingly, entry of the instant Amendment, as an earnest attempt to advance prosecution and reduce the number of issues, is requested under 37 CFR 1.116.

Applicant submits that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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